

**What is claimed is:**

1. A computer-implemented method of reconstructing a regular 3D model by feature-line segmentation, comprising using a computer to perform  
5 the steps of:
  - (a) inputting original 3D model data;
  - (b) building 3D feature-lines according to the original 3D model data;
  - (c) converting the 3D feature-lines into 3D  
10 threads having respective pluralities of connection joints, connection lines, and loops;
  - (d) determining sample numbers of each connection line, adding or deleting the  
15 loops, and outputting the 3D threads;
  - (e) producing a regular triangular grid sample model according to the 3D threads;
  - (f) projecting the regular triangular grid sample model into the original 3D model to  
20 produce a reconstructed 3D model;
  - (g) redetermining sample numbers for each connection line, readding or redeleting the loops, and repeating steps (e) and (f) if  
25 the reconstructed 3D model does not satisfy resolution requirements, and outputting the reconstructed 3D model if the reconstructed 3D model satisfies the resolution requirements.

2. The computer-implemented method as claimed in claim 1, wherein the 3D feature-lines in step (b) are based on the exterior appearance and structure of the original 3D model.

3. The computer-implemented method as claimed in claim 1, wherein step (c) further comprises the steps of:

obtaining intersection points of the 3D feature-  
5 lines as the connection joints;  
recording the connection lines connecting to each  
connection joint; and  
searching the connection lines constructing  
closed zones as the loops.

4. The computer-implemented method as claimed in claim 1, wherein step (e) further comprises the steps of:

constructing regular triangular grids in each  
5 loop according to the sample numbers of each  
connection line in step (d); and  
combining the closed regular triangular grids of  
the loops as the regular triangular grid  
sample model.

5. A computer-implemented method of reconstructing a regular 3D model by feature-line segmentation, comprising using a computer to perform the steps of:

5 inputting original 3D model data;

building 3D feature-lines according to the  
original 3D model data;  
converting the 3D feature-lines into 3D threads  
having respective pluralities of connection  
10 joints, connection lines, and loops;  
determining sample number of each connection  
line, adding or deleting the loops, and  
outputting the 3D threads;  
producing a regular triangular grid sample model  
15 according to the 3D threads;  
projecting the regular triangular grid sample  
model into the original 3D model to produce  
a reconstructed 3D model;  
outputting the reconstructed 3D model.

6. The computer-implemented method as claimed  
in claim 5, wherein the 3D feature-lines in the build  
step are based on the exterior appearance and  
structure of the original 3D model.

7. The computer-implemented method as claimed  
in claim 5, wherein the conversion step further  
comprises the steps of:

obtaining intersection points of the 3D feature-  
5 lines as the connection joints;  
recording the connection lines connecting to each  
connection joint; and  
searching the connection lines constructing  
closed zones as the loops.

8. The computer-implemented method as claimed in claim 5, wherein the producing step further comprises the steps of:

5       constructing regular triangular grids in each  
          loop according to the sample numbers of each  
          connection line in the determination step;  
          and

          combining the closed regular triangular grids of  
          the loops as the regular triangular grid  
10       sample model.